

2002 International Infantry & Joint Services Small Arms System Section Symposium Atlantic City



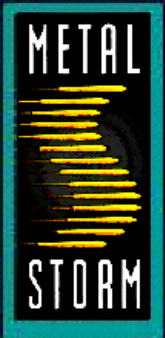
**Presented by
Mike O'Dwyer**

mikeodwyer1@compuserve.com

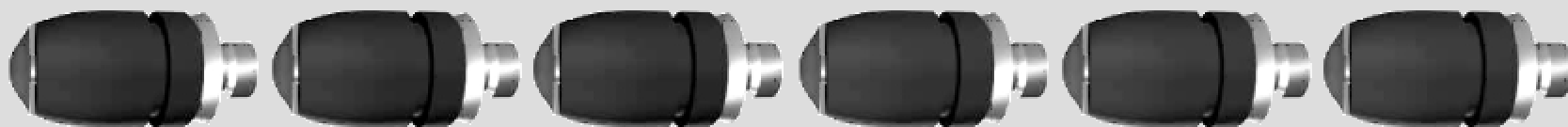


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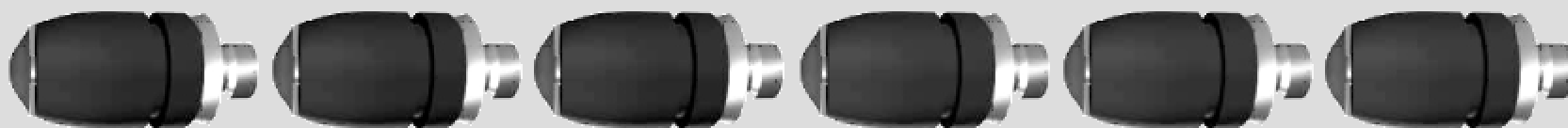
MULTIPLE EFFECTS WEAPON SYSTEM



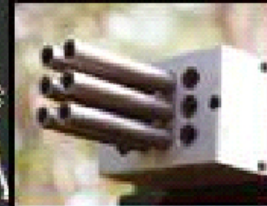
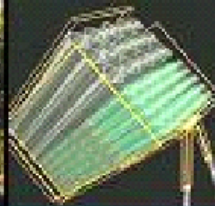
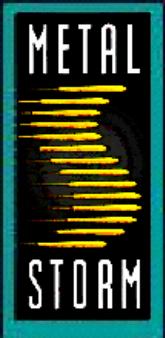
- No moving parts. Only the bullets move.
- One Simple Tube is an Operating Weapon.
- Multiple Barrels / Multiple Effects in One System.
- Electronically Variable Rates of Fire.
- High Ammunition Density / The Magazine is the Weapon.
- Demonstrated to 36 Barrel-Group Pod.
- Increased Reliability, Little Maintenance.



MULTIPLE EFFECTS WEAPON SYSTEM



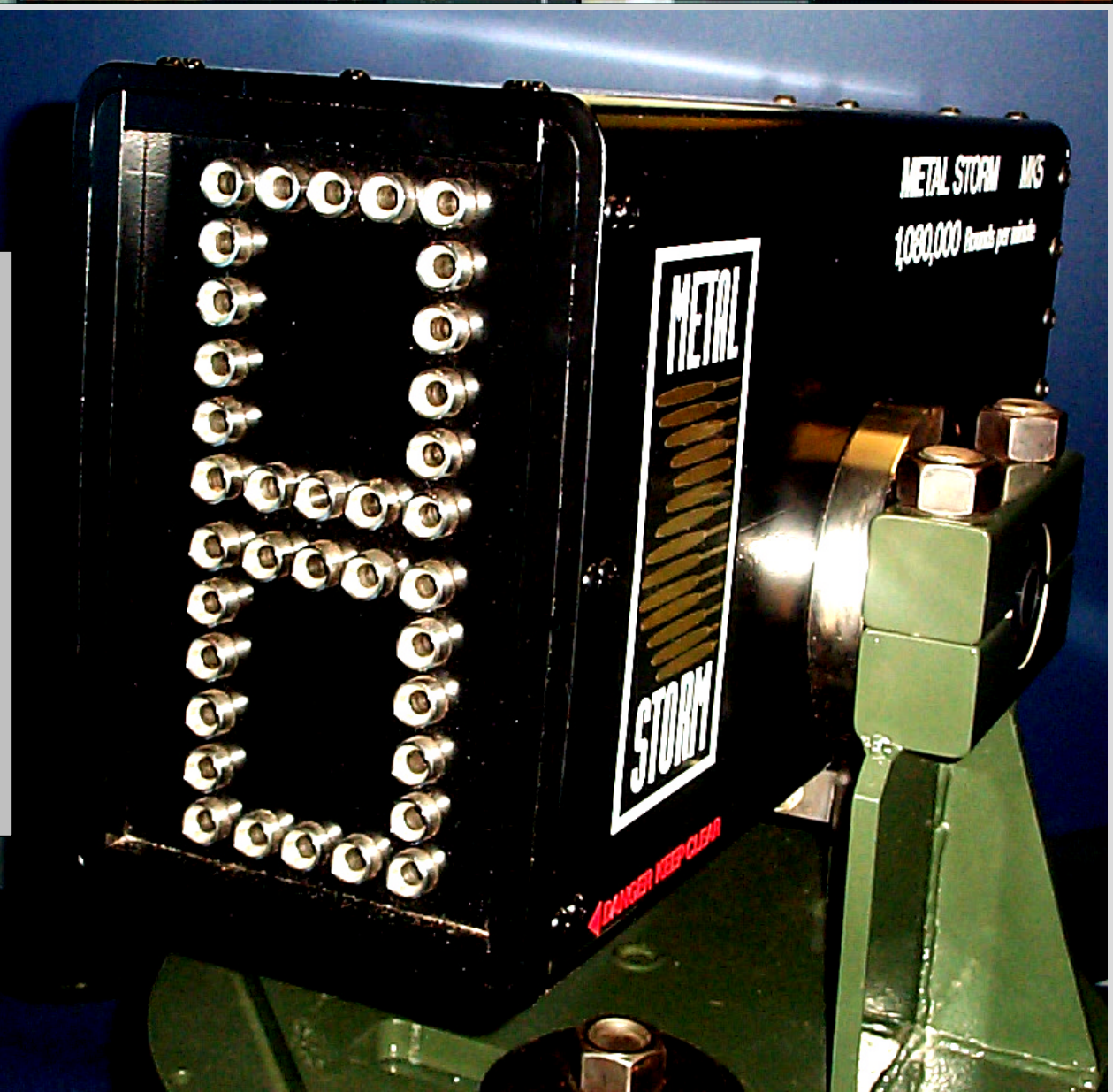
- **Confirmed Calibers: 9mm, 40mm, 60mm.**
- **On the Way: 7mm, .50Cal, 81mm.**
- **Confirmed Pressures to 50K psi.**
- **Reloading Demonstrated via Multi-Shot Cartridge.**
- **All Rounds in the Stack are Ballistically Consistent via Graduated Propellant Loading.**
- **Electronic Keying for User[s] Authorization.**



**A TOTALLY
Electronic System**
Fire One barrel
Fire Any barrels
Fire All Barrels

Infinitely Variable Rates

Mix the Calibers
Mix the Ammo Types





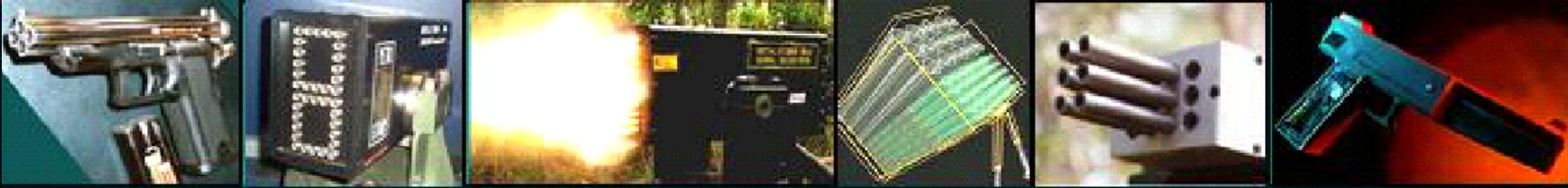
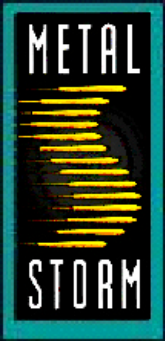
GVT. FUNDED RESEARCH PROGRAMS

- **Advanced Individual Combat Weapon**
- **Area Denial Weapon System**
[Landmine Replacement]
- **Joint US / Australian R&D Program**
[Vehicle Self Defense]
- **High Pressure Barrel**



COMPANY RESEARCH ACTIVITY

- **Variable-Lethality Handguns**
- **20mm OICW Equivalent Ammunition**
- **25mm OCSW Equivalent Ammunition**
- **Access Denial Weapon System**
- **Firefighting Pod-System**



GVT. FUNDED RESEARCH PROGRAMS

- **Advanced Individual Combat Weapon**

The Concept -- A Two Barrel Hybrid:

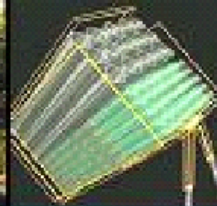
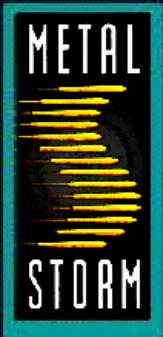
Top Barrel: **Metal Storm Stacked-Rounds Tube**

Bottom Barrel: **Conventional 5.56 Assault**



TWO Barrels. ONE Magazine

- 20/30/40mm Top Barrel[s]
- Fully Compliant with Land Warrior
- Lethal Lightweight Compact



DEPARTMENT OF DEFENCE
DEFENCE SCIENCE & TECHNOLOGY ORGANISATION

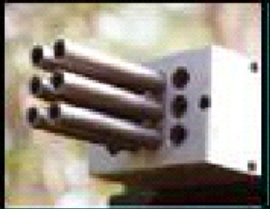
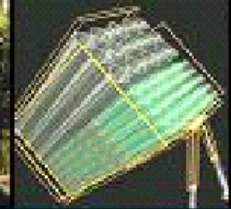
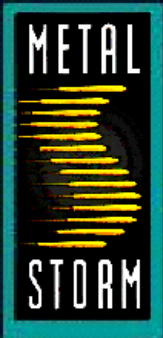
DSTO

The Program: Advanced Individual Combat Weapon

Two Barrels - One Magazine

The prototypes being developed will have a dual barrel capability to fire both 20/40mm bursting munitions and standard 5.56mm NATO ammunition





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DSTO



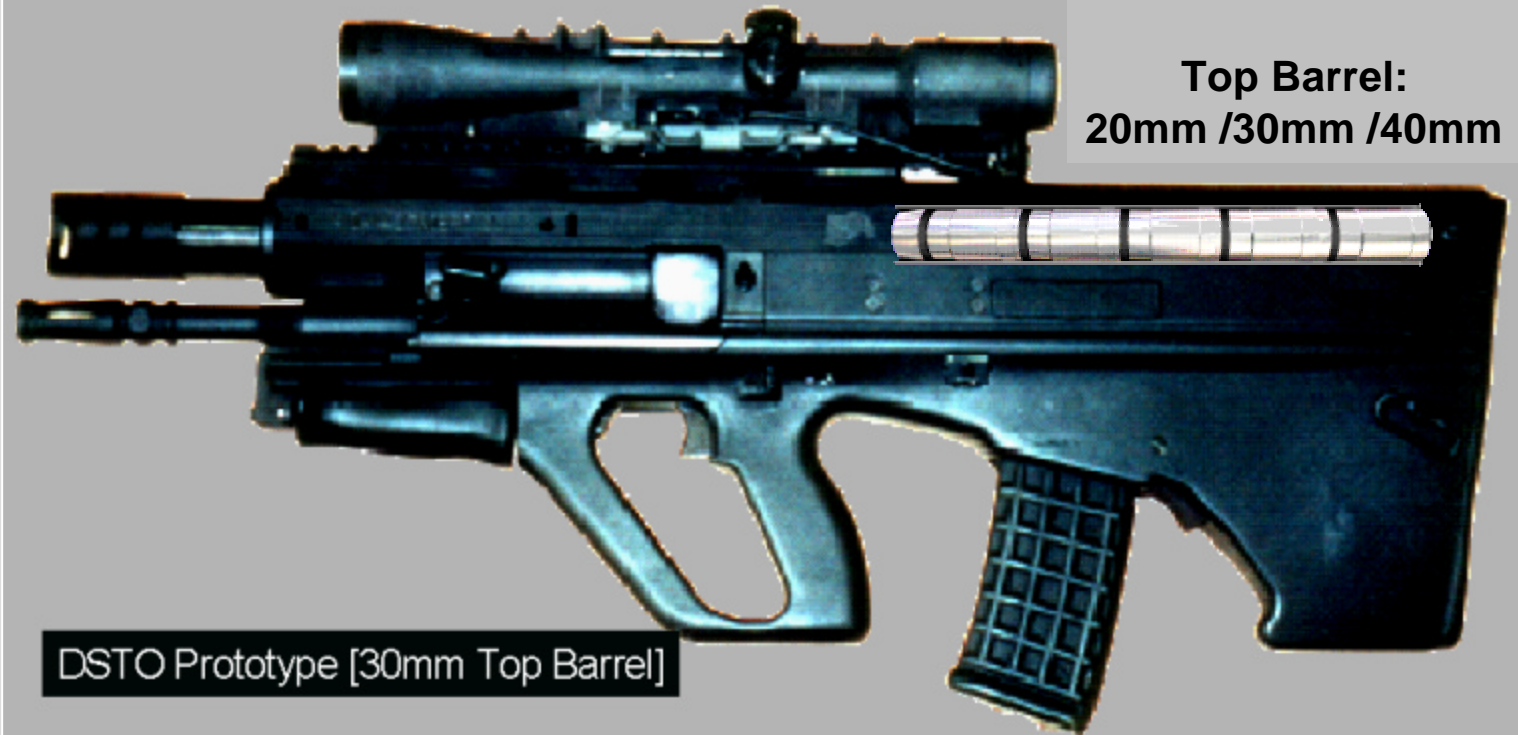
Advanced Individual Combat Weapon [AICW]

Two Barrels - One Magazine

Lightweight - Rugged - Lethal - Prone Firing

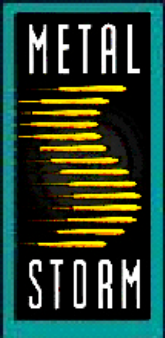
A Hybrid:

Metal Storm
Integrated
with a
5.56 Styer
Infantry Rifle



Top Barrel:
20mm /30mm /40mm

DSTO Prototype [30mm Top Barrel]



AICW: Weight is DOWN. Lethality is UP.

KPPs

Weight

Lethality

**Firing
Positions**

Ruggedness

AICW

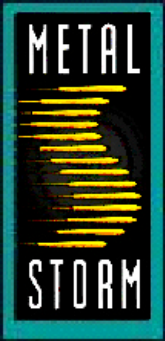
10-12 Lbs.

20, 30 and 40mm Airbursting

Includes Prone [Only one Magazine]

Totally Removes One Mechanical Barrel

Can Adapt onto Many : ie- M16, M4, SMG's



GVT. FUNDED RESEARCH PROGRAMS

Area Denial Weapon System

[Landmine Replacement]

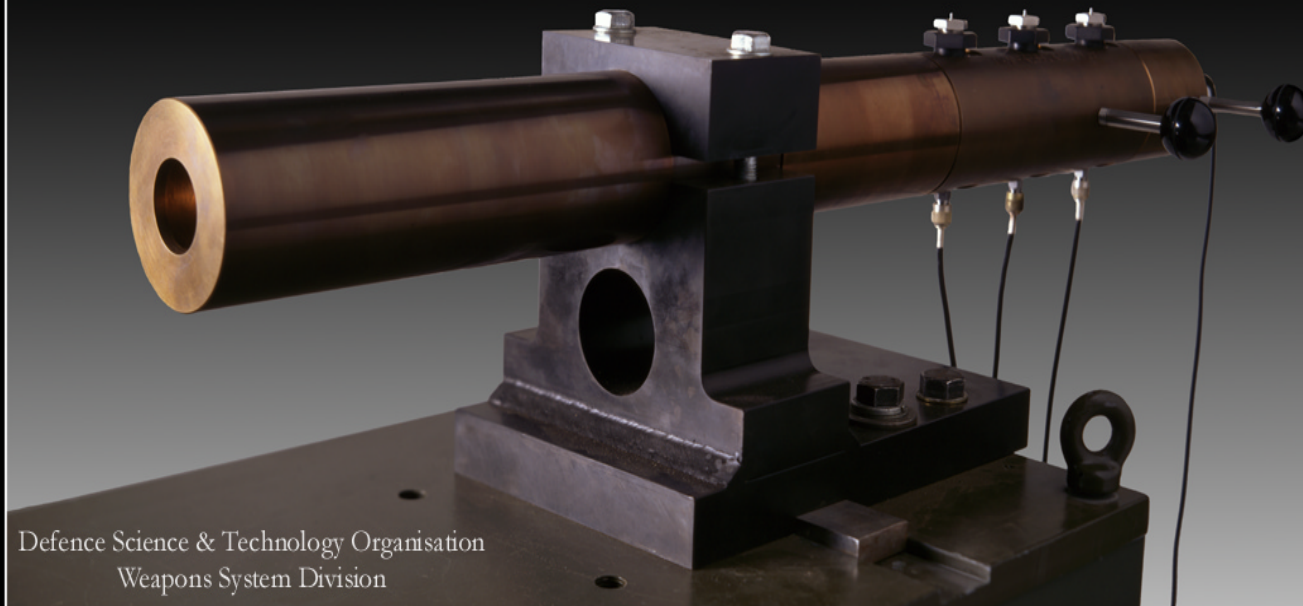


Department of Defence

Defence Science and Technology Organisation

Mk1 40mm Grenade Launcher Testbed

The Program is based on the existing success of the 40mm stacked-tube research completed by DSTO



Defence Science & Technology Organisation
Weapons System Division

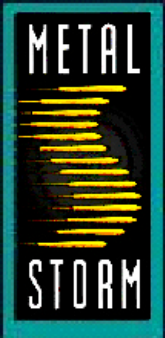
Two still images taken from the high speed film record of the 20,000 rpm firing in the Mk1 test-bed.

Round 1 just exiting
from barrel

100mm
scale grid

Round 2 exiting ~ 3ms later,
partly obscured by smoke cloud

Round 1



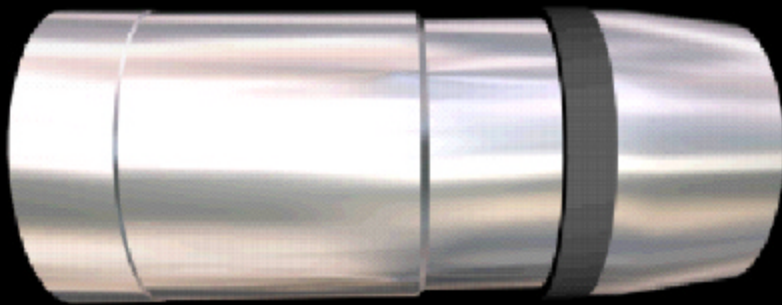
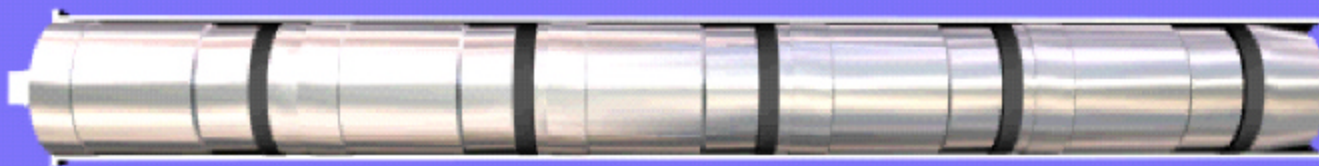
DEPARTMENT OF DEFENCE
DEFENCE SCIENCE & TECHNOLOGY ORGANISATION

DSTO

Experimental Program

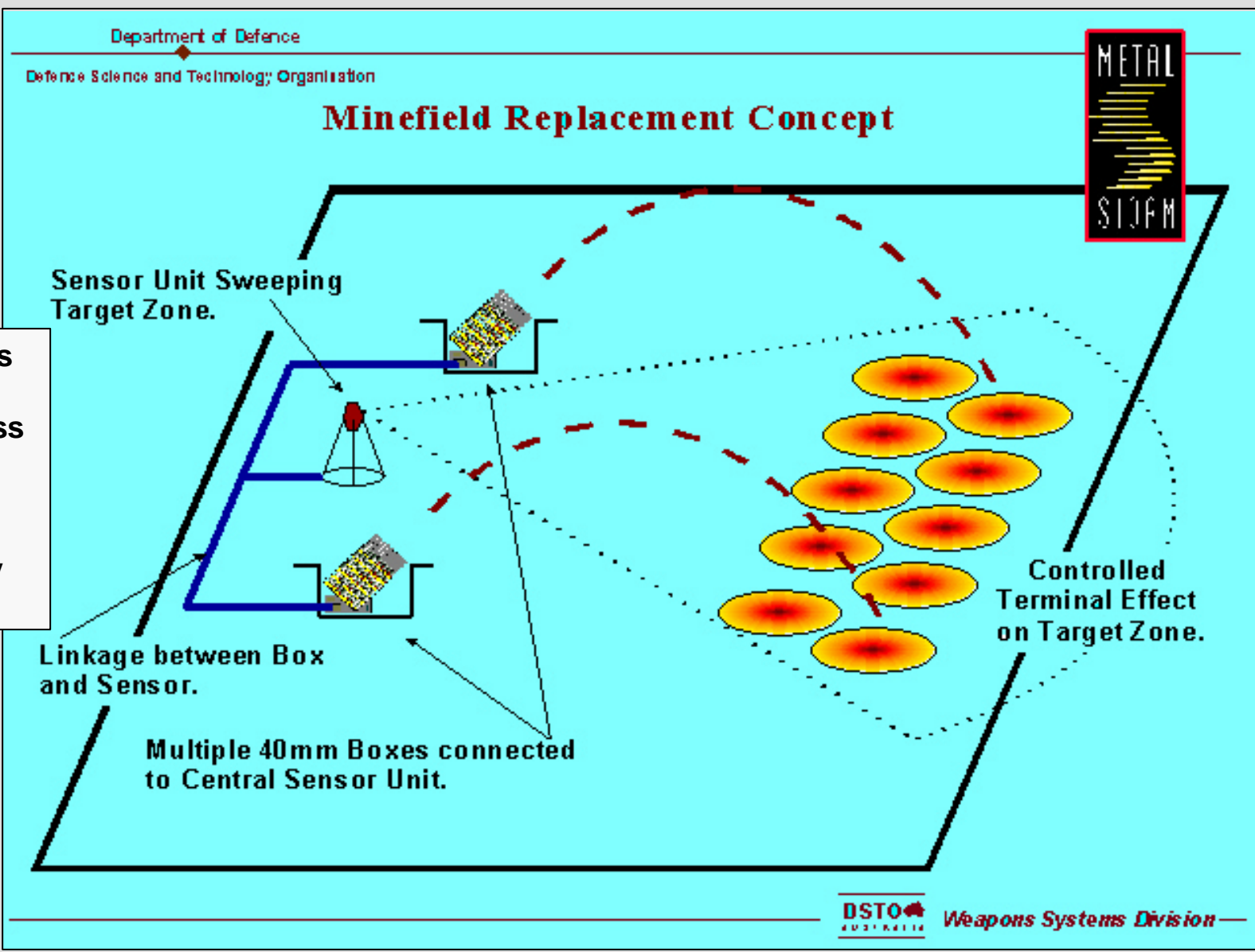
- 40mm Multi-Shot Lightweight Composite Cartridge Case

Cartridge unit is completely self contained

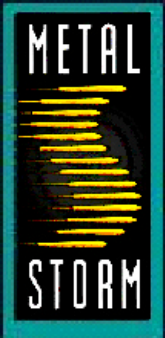


Projectile Weight	270g
Projectile Length	96mm
Propellant Type	AR2205
Pressure	110 / 150 MPa
Muzzle Velocity	240 / 316 m/s
Dispersion	20m
Maximum Range	1,700m

The 40mm system has fired at the rate of 20,000 rpm. per barrel



The Program is based on the existing success of the 40mm stacked-tube research completed by DSTO



Landmine Replacement System

Each box holds 600 grenades

Fires Lethal and Less-than-Lethal

Fires HE /smoke / flares etc.

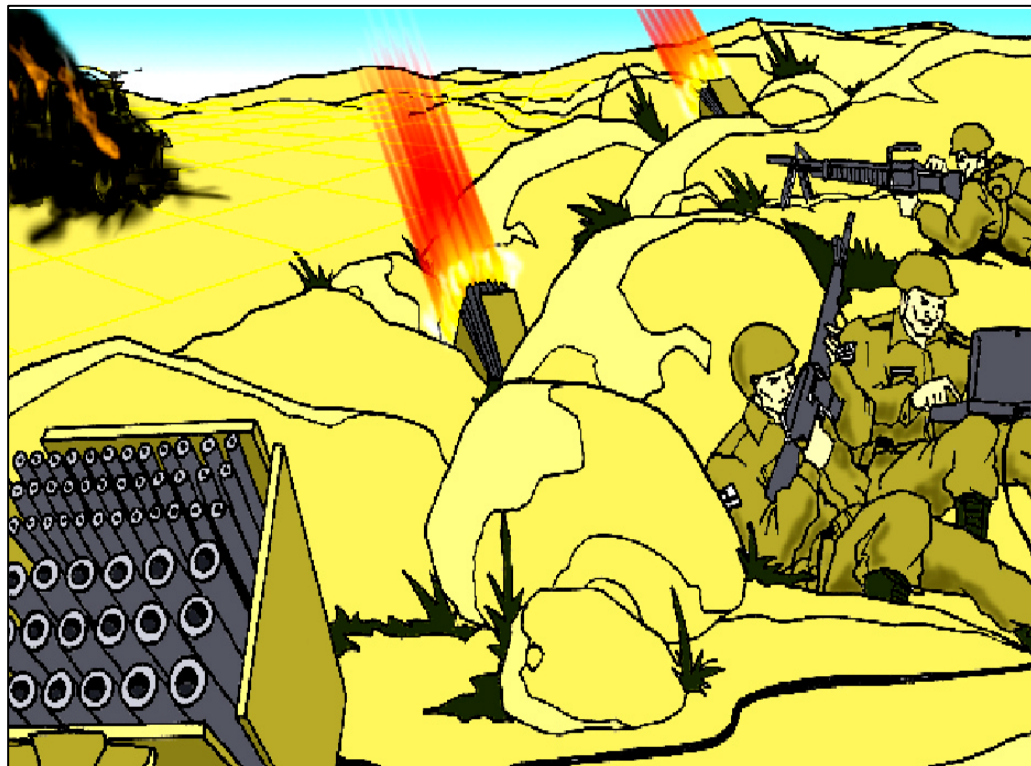
Splaying barrels / Variable Impact

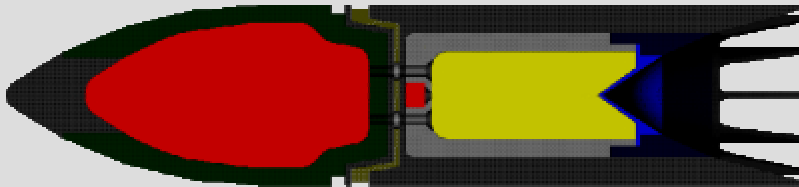
Max rate per box 2M rpm

Man-in-the-loop capable

No Moving parts

100% Electronic

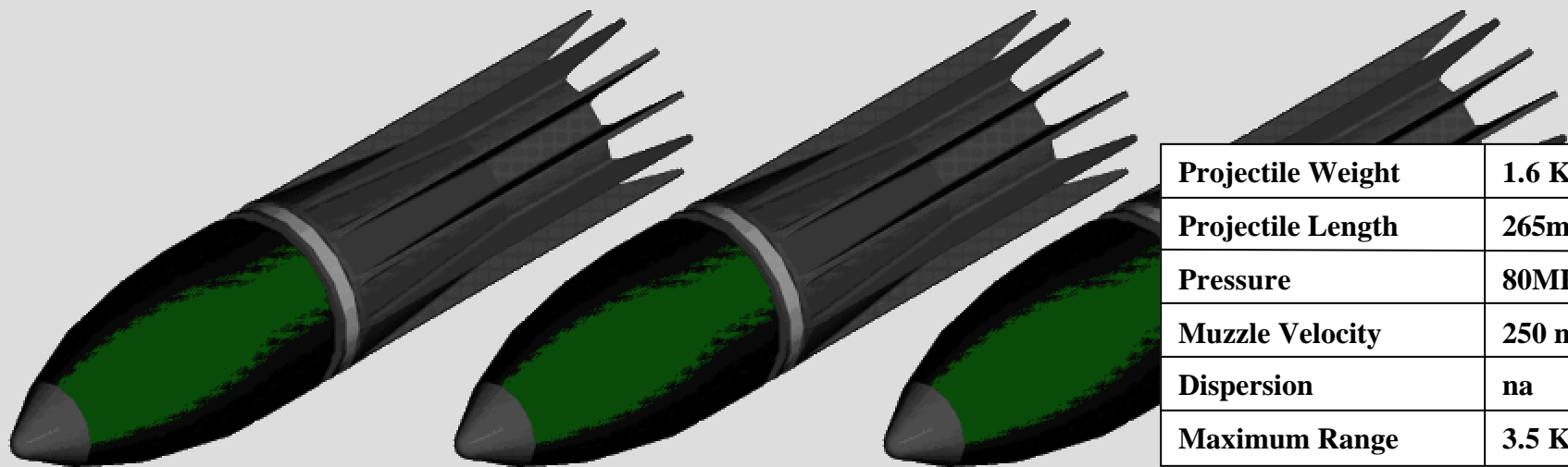




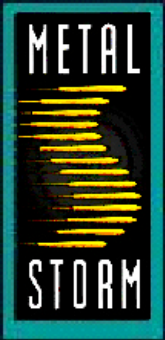
Now Firing in 60mm Configuration

The 60mm test firing proves the capability of a Metal Storm weapon system to

- .. Destroy vehicles or infrastructure
- .. Damage or disable armoured vehicles
- .. Raises the potential lethal area to 4-5 times greater than 40mm rounds

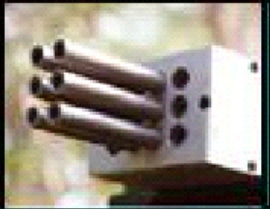
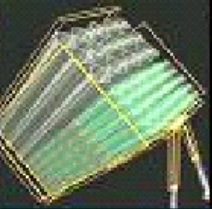
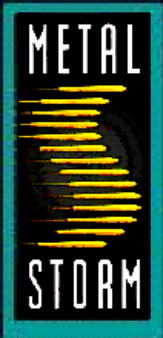


Projectile Weight	1.6 Kg
Projectile Length	265mm
Pressure	80MPa
Muzzle Velocity	250 m/s
Dispersion	na
Maximum Range	3.5 Km



GVT. FUNDED RESEARCH PROGRAMS

- **Joint US / Australian R&D Program**
[Vehicle Self Defense]



Department of Defence

Defence Science and Technology Organisation

Metal Storm Grenade Pod Vehicle Defence Concept

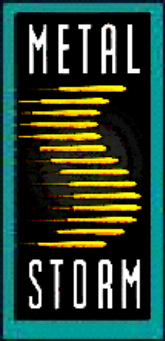


Metal Storm Grenade Box with sensor

Threat

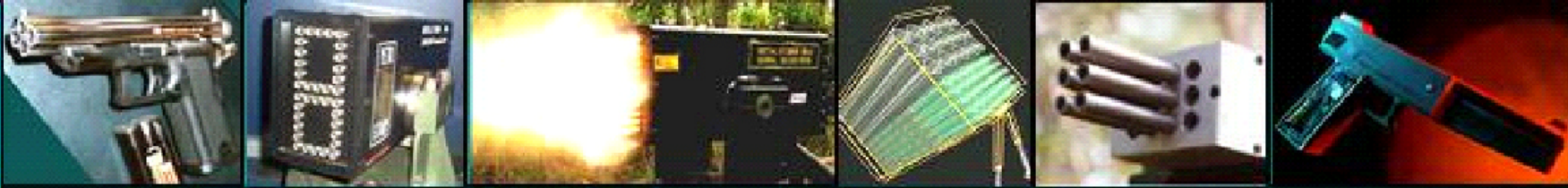
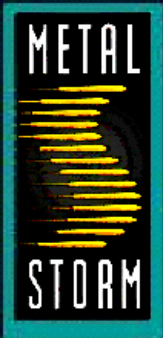
Grenade Pod with tracking sensor provides vehicle protection.

Joint US /
Australian
Government
Development
Program



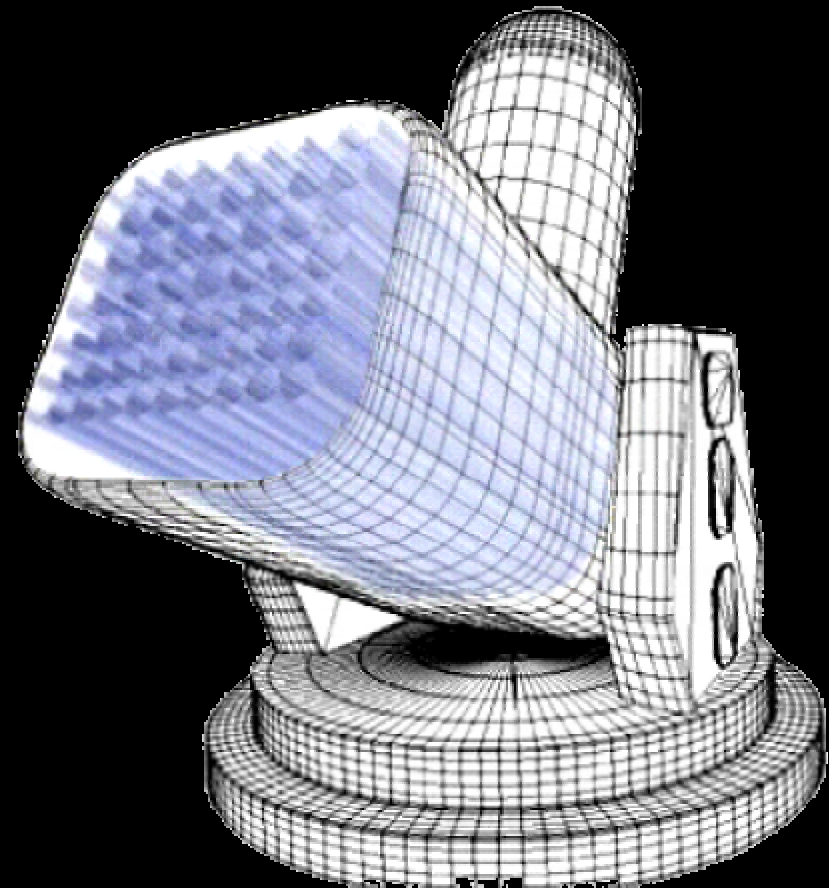
GVT. FUNDED RESEARCH PROGRAMS

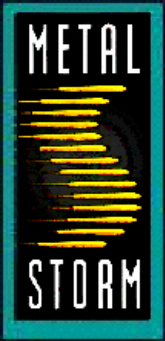
- **High Pressure Barrel**



METAL STORM

HIGH PRESSURE BARREL:
The focus will include innovative, multi-purpose, high-pressure designs and projectiles for rifled barrels to demonstrate capabilities from a tactically relevant 0.50 caliber system.





COMPANY RESEARCH ACTIVITY

- **Variable-Lethality Handguns**



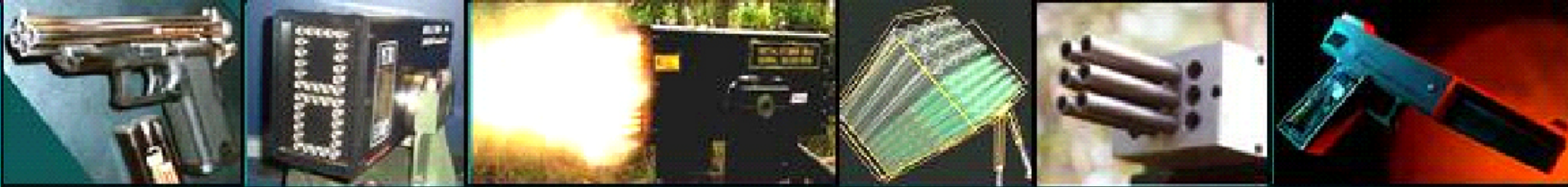
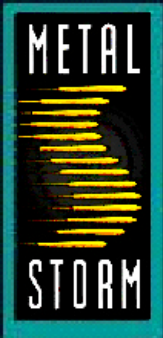
The Operator can Select:

- Semi Auto Firing
- Double Tap @ 45,000 rpm
- Triple Tap @ 60,000 rpm
- High Energy Traveling-Charge Mode at 500,000 rpm *

**VLe:
MULTIPLE
EFFECTS
Handgun**



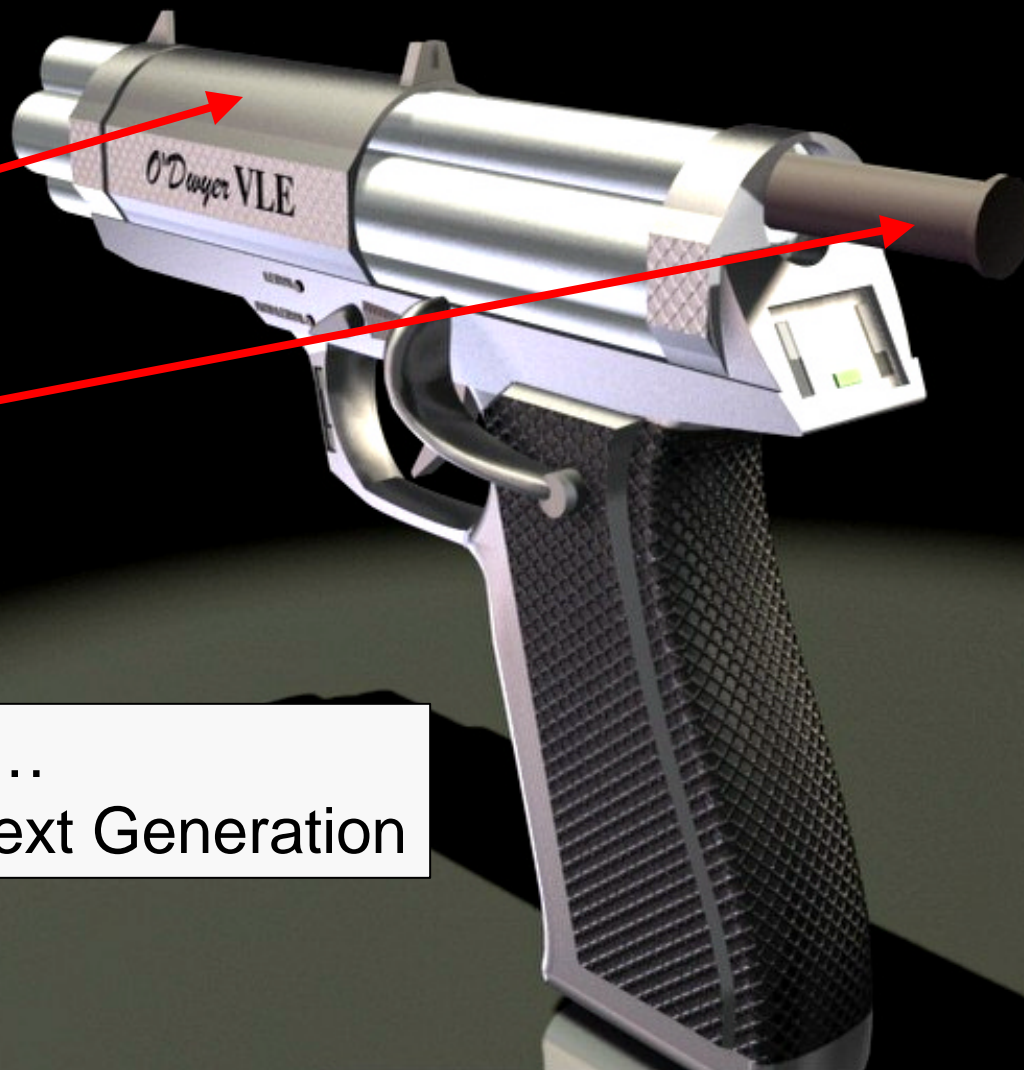
* Firing 2 Rounds at 500,000 rpm 'pushes' the First Round.
Up to 56 % increase in Kinetic Energy.



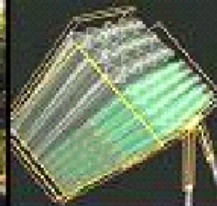
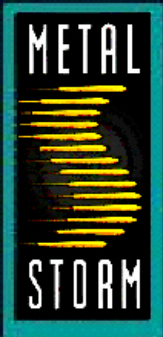
**Operate the
Reload-
Slide**

**to
Reload a
Multi-Shot
Cartridge**

**and
generate
Back-Up
Electrical
Energy**

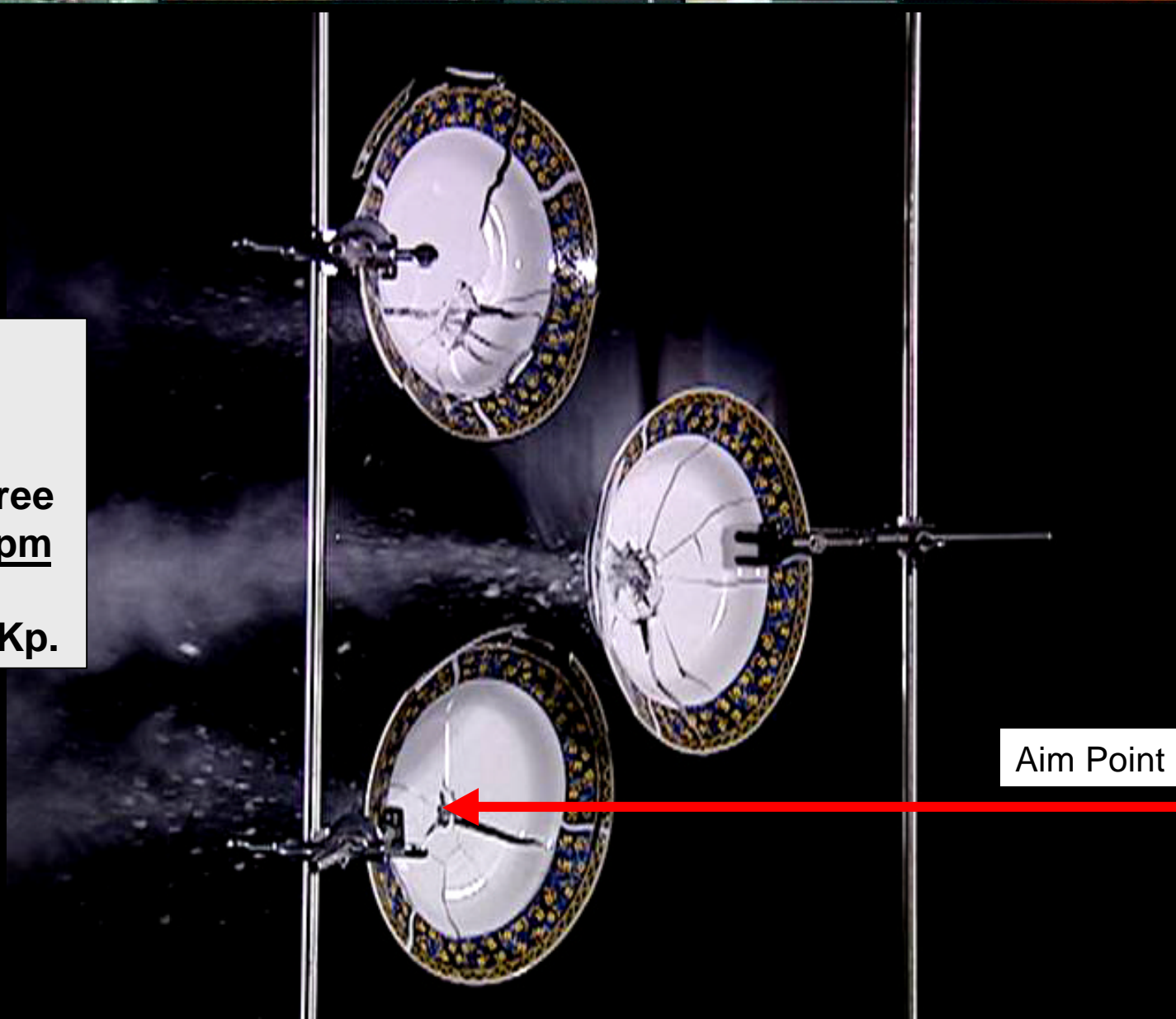


**VLe II...
The Next Generation**

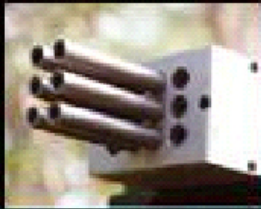
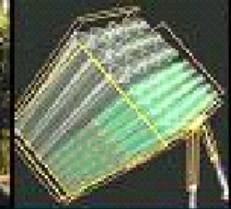
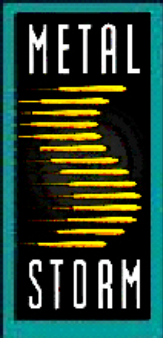


Triple-Tap Demonstration

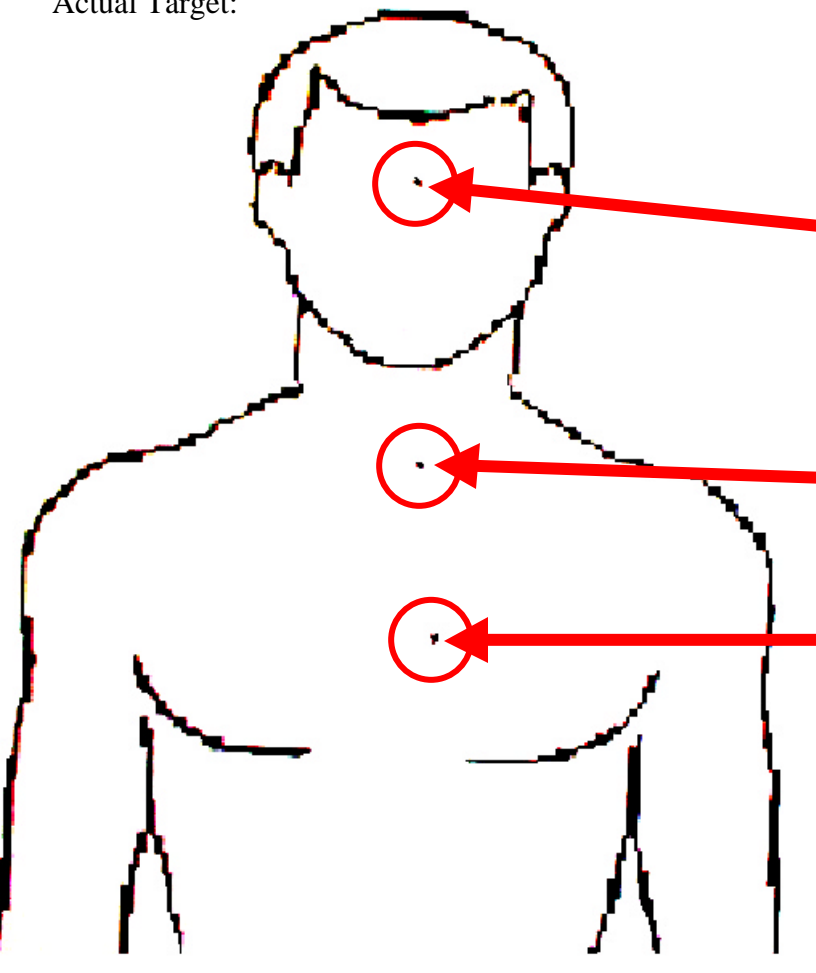
Debris trails of Three
bullets at 60,000 rpm
illustrates the
increased Hp and Kp.



Aim Point



Actual Target:



3rd Round

2nd Round

Aim Point

9mm VLE Handgun

- Range 8 yds

Rate of Fire

- 2-3 @ 60,000 spm
- 1-2 @ 45,000 spm

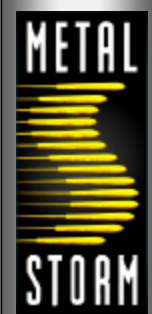
Firing Duration

- 0.0023 secs.

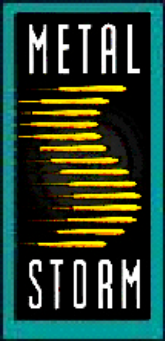
Vertical Separation of Shots

- | | |
|---------|---------|
| Total | 30.5 cm |
| • 2-3 @ | 18.5 cm |
| • 1-2 @ | 12.0 cm |

Click Above

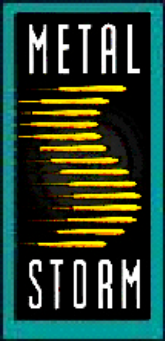


Triple-Tap
40 Seconds
Demonstration Video Clip



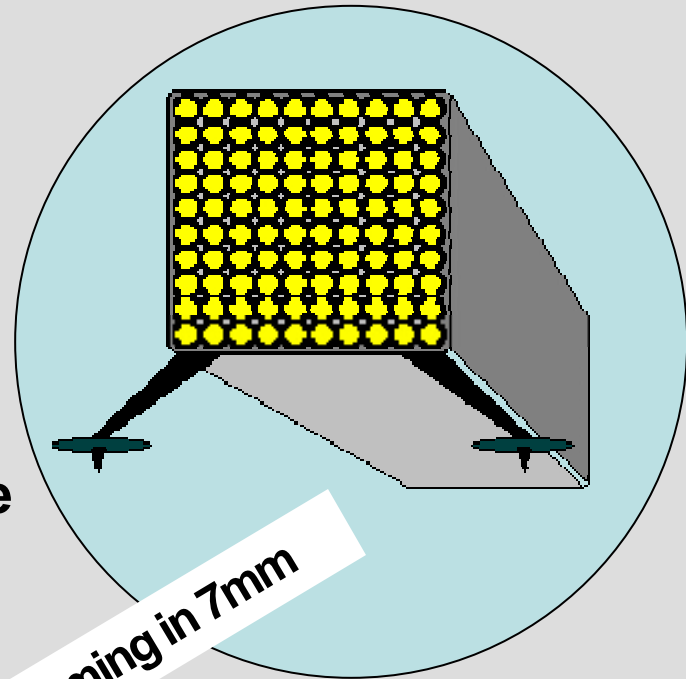
COMPANY RESEARCH ACTIVITY

- **Access Denial Weapon System**

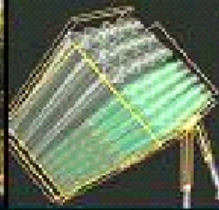
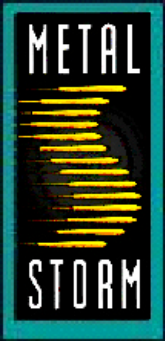


Repeatable Access Denial System

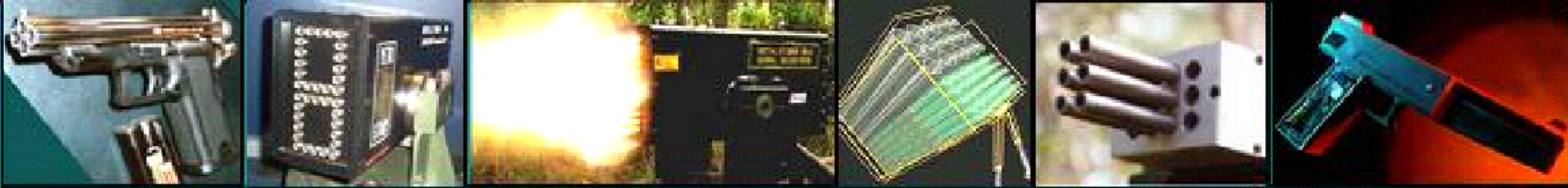
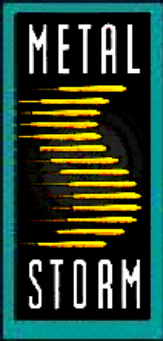
- Cover Withdrawal / Set Ambush / Asset protection
- 100 Barrels. 400 Rounds [.22 caliber]
- Random-Fire Mode to Cover Withdrawal
- 40 Secs. of fire at 600 rpm
- 'Explosive' Fire at 4.5 million rpm.
- Programmable to Imitate heavy Caliber Fire
- 4in square. 6in long. 5lb.



Now Coming in 7mm

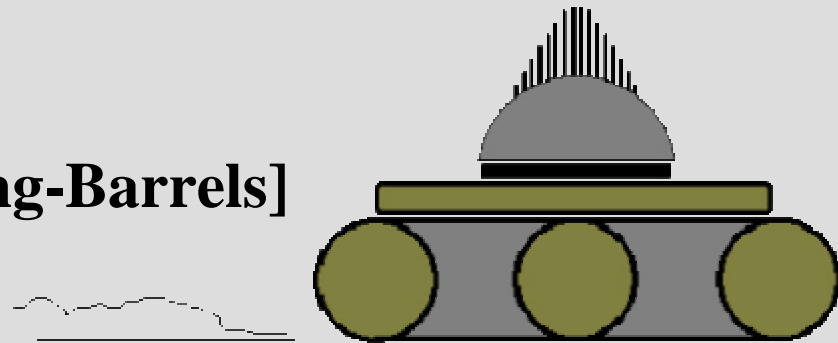


Robotic Applications

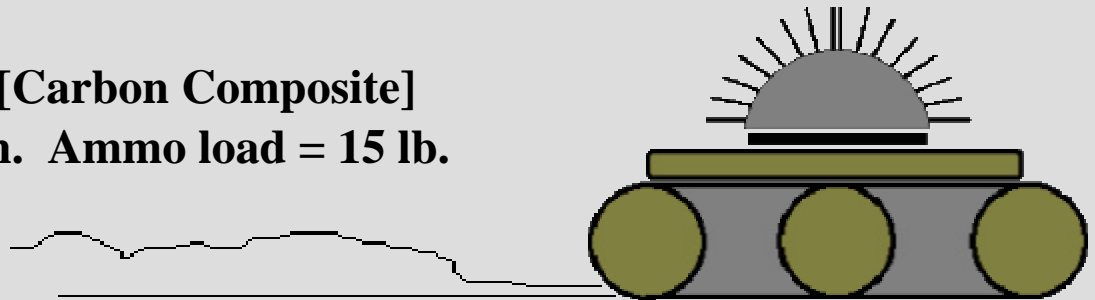


- **Urban Combat Robot [Folding-Barrels]**

Approx Length 2.5 ft. Height 20 in.

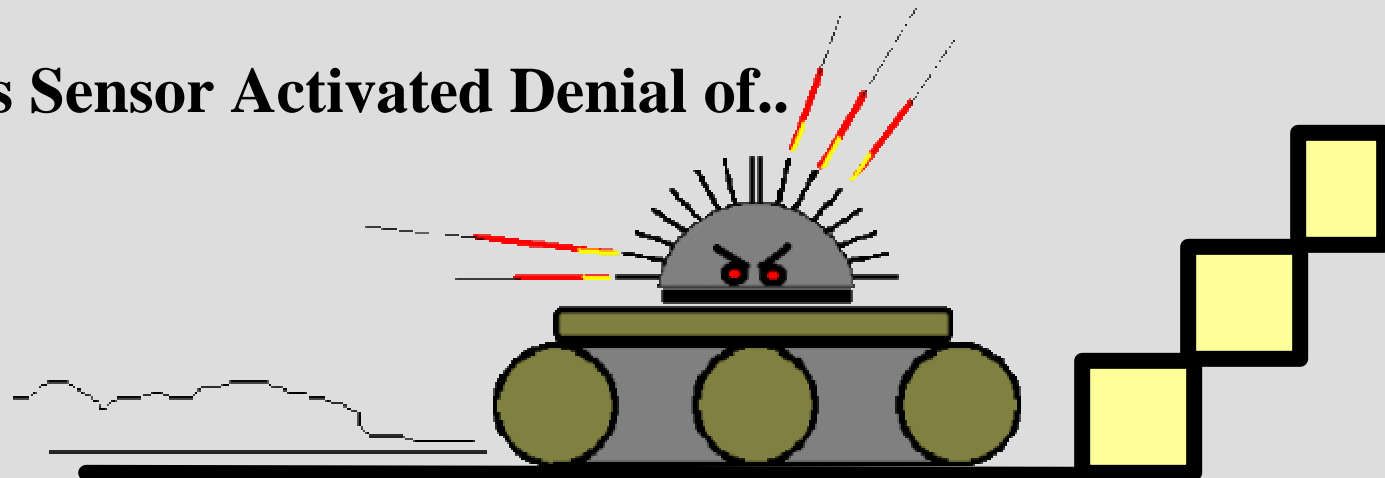


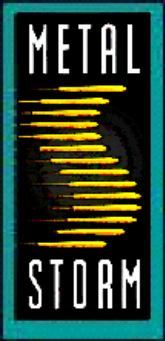
B. Unfolded: 116 Barrels [Carbon Composite]
1,508 Projectiles 7mm x 11mm. Ammo load = 15 lb.



C: Autonomous Sensor Activated Denial of..

- Choke Points
- Stairs
- Doorways





LIGHT Revolving Gun-Carousel

1. Area Clearing 2. Cave Clearing 3. Set Ambush 3. Psychological Effect

1,000 rounds. 100 barrels

Sustained fire at 600 rpm = 1.7 mins.

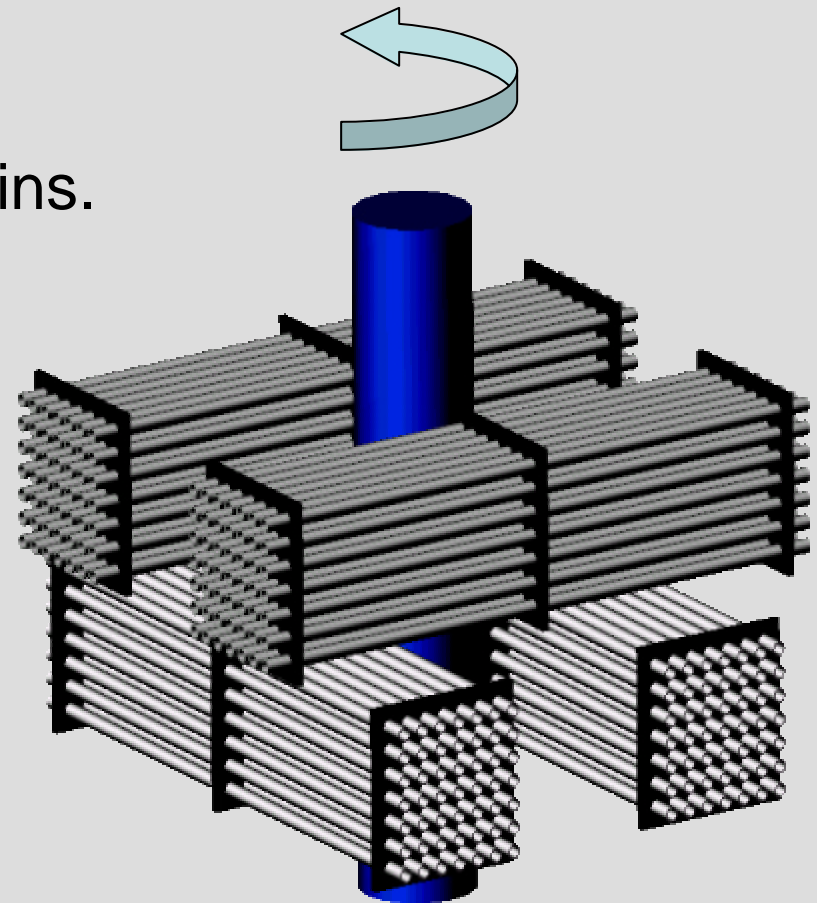
Max rate of fire = 4.5 million rpm

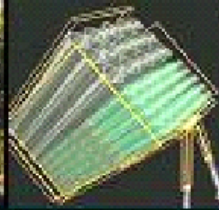
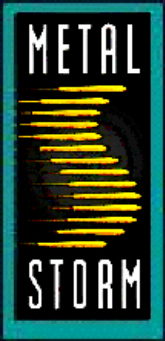
Composite 9mm barrels = 25 lb

Ammunition = 20 lb

No moving parts in the guns

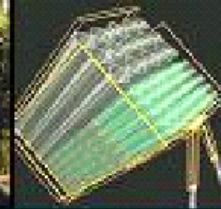
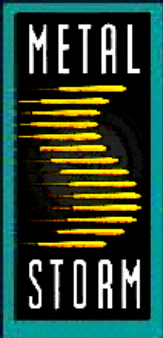
Can fire 360 degrees
or to set quadrants





LIVE FIRING DEMO.

-- 20 Seconds --



VLe Handgun:

- * Semi Auto
- * Double Tap
@ 45,000 rpm
- * Triple Tap
@ 60,000 rpm
- * High Energy
@ 500,000 rpm

6 Barrel Testbed:

- * 600 rpm burst
- * 90 rounds
@ 120,000 rpm

40mm Testbed:

- * 4 Rds
@ 6,000 rpm

METAL STORM

An Electronic Firing Demonstration

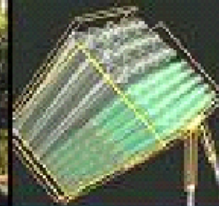
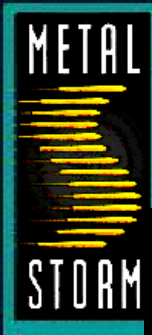
Blossom Point, Maryland

July, 2000

Live Firing

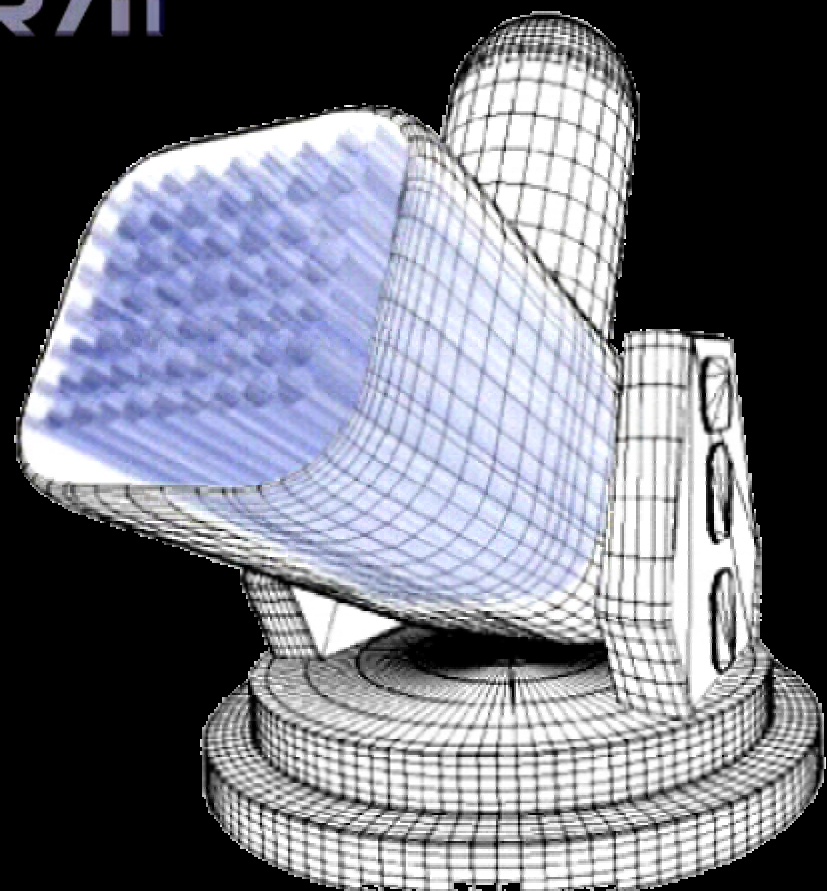
20 Seconds

Demonstration Video Clip



METAL STORM

QUESTIONS ?



Land Warrior *Compatible*

The Weapon

- Light Weight Thermal Sight
- Multifunctional Laser
- Color Daylight Video Sight (DVS)

The Integrated Helmet Assembly (IHAS)

- Helmet Mounted Color Display
- Land Warrior Assault Helmet
- Audio System
- Night Display

The Computer/Radio Subsystem (CRS)

- Comms/Nav Box / GPS / Inertial Nav
- Handheld Flat Panel display
- Secure Voice and Digital Comms

The Software Subsystem

- Common Tactical Picture
- Map: Own / Others Location
- Graphics and Orders
- Power Ops / Video In / Out





METAL
STORM

